

elucidate electro-chemical decomposition, show some new conditions of that action, evolve new views of the internal arrangements and changes of the substances under decomposition, and perhaps give efficient powers over matter as yet undecomposed.

188. For the purpose of rendering the bearings of the different parts of this series of researches more distinct, I shall divide it into several heads.

**[f i. New conditions of Electro-chemical Decomposition*

189. The tension of machine electricity causes it, however small in quantity, to pass through any length of water, solutions, or other substances classing with these as conductors, as fast as it can be produced, and therefore, in relation to quantity, as fast as it could have passed through much shorter portions of the same conducting substance. With the voltaic battery the case is very different, and the passing current of electricity supplied by it suffers serious diminution in any substance, by considerable extension of its length, but especially in such bodies as those mentioned above.

190. I endeavoured to apply this facility of transmitting the current of electricity through any length of a conductor, to an investigation of the transfer of the elements in a decomposing body, in contrary directions, towards the poles. The general form of apparatus used in these experiments has been already described (48, 52); and also a particular experiment (55), in which, when a piece of litmus paper and a piece of

turmeric
paper were combined and
moistened in solution of
sulphate of
soda, the point of the wire
from the machine
(representing the
positive pole) put upon the
litmus paper, and the
receiving point
from the discharging train (28,
52), representing the negative
pole,
upon the turmeric paper, a
very few turns of the machine
sufficed
to show the evolution of acid
at the former, and alkali at
the
latter, exactly in the manner
effected by a volta-electric
current.
191. The pieces of litmus
and turmeric paper were
now
placed each upon a separate
plate of glass, and connected
by an
insulated string four feet
long, moistened in the same
solution of
sulphate of soda: the
terminal decomposing wire
points were
placed upon the papers as
before. On working the
machine,
the same evolution of acid
and alkali appeared as in the
former
instance, and with equal
readiness, notwithstanding
that the
places of their appearance w
ire four feet apart from each
other.
Finally, a piece of string,
seventy feet long, was used.
It was